

Andrew Jahn, Ph D  
Environmental and Statistical Consulting  
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### **Education**

University of California at Davis, BS in Biological Sciences, Honors  
Woods Hole Oceanographic Institution, PhD in Biological Oceanography  
Hawaii Institute of Marine Biology, Postdoctoral Fellow

### **Biostatistics, Study Design, and Peer Review**

Dr Jahn has designed sampling programs and experiments to analyze effects of coastal power stations, spills, and various marine industrial activities since 1976. He has published papers on precision and estimation methods in the fisheries literature and served as a peer reviewer for the journals *Copeia*, *Fishery Bulletin*, *Journal of Experimental Marine Biology and Ecology*, *Transactions of the American Fisheries Society*, *Estuaries and Coasts*, and *CalCOFI Reports*. Also reviewed proposals and reports for the Los Angeles Department of Water and Power, Southern California Edison Company, National Science Foundation, Sea Grant, California Coastal Commission, San Francisco Estuary Institute, and various water quality and energy-related projects in coastal and inland waters. His recent contributions include an analysis of statistical power and sampling strategy for the fish contaminants study segment of the San Francisco Bay Regional Monitoring Program, experimental design for a study of pile-driving effects on juvenile salmon, an analysis of salmonid migration patterns in San Francisco Bay, and the development of a method for estimating fish loss at water export facilities in the Sacramento/San Joaquin Delta.

### **Fisheries and Habitat Enhancement**

Co-designed a modular experimental reef concept for testing design, materials, and layout effects of rubble reef construction on giant kelp colonization and growth. Designed and managed a program of sampling, analysis, and data presentation to evaluate subtidal habitat quality in Oakland Middle Harbor. Participated in stakeholder meetings and biological assessments. Designed and managed follow-up research on habitat-specific fish food habits and on the impacts of the enhancement project and associated dredging activities on the food and feeding behavior of the endangered California least tern, an obligate fish-eating bird. Dr Jahn has 40 years of experience in diverse aspects of fish (including larval fish) ecology, behavior, and habitat associations in ocean, estuary, and freshwater environments. Recently analyzed trawl data and acoustic tag detections to describe migration patterns of salmonid smolts in San Francisco Bay.

**Project Experience:**

**Power Analysis for Fish Tissue Sampling in San Francisco Bay** Partitioned variance into temporal and spatial components and performed statistical power analysis for various re-design scenarios for a long-term monitoring program of contaminant concentrations in fish and bivalve tissues.

**Least Tern Foraging and Forage Base in San Francisco Bay** Designed conceptual framework for contractors to conduct field studies on and around Alameda Point least tern colony and managed studies for Port of Oakland's -50' Project. Also designed tern monitoring for other proposed Port projects. Described pattern of least tern foraging with respect to harbors and dredging areas in Central Bay, including review of all least tern studies performed on the Alameda colony. Summarized literature on effects of turbidity on plunge-diving birds, in face of contractor failure to produce data on least tern-turbidity habitat relationship. Presented findings to USFWS personnel.

**Application of Central Limit Theorem to Ichthyoplankton Sampling** Analyzed variance structures of large pelagic egg and larval data sets and performed sampling experiments on simulated populations. Published tables of effects of contagion and sample size on relative width of confidence intervals. Compared methods of interval estimation.

**Effects of lights on fish behavior** Designed and managed an experimental approach to determining the feasibility of using lights to increase the efficiency of a power plant cooling intake fish bypass system. Project included experimentation, underwater light measurement, turbidity studies, and publication of results in EPRI conference proceedings. Subsequent in-plant implementation was done in cooperation with Coastal Commission staff.

**Benthic Community Studies**

Performed multivariate statistical analysis of the relationship of benthic community structure to physical and chemical measures in sediment for various outfall studies in San Francisco Bay. Wrote a procedure for bootstrap analysis of the significance of statistical clusters, performed and described principles of ordination analysis and other descriptive statistical techniques.

**Siting and design studies for an artificial reef for kelp**

Candidate sites were surveyed and ranked according to selection criteria specified by the California Coastal Commission (CCC). Siting and design were both aided by the compilation of a GIS data base consisting of a time series of kelp bed maps as well as geotechnical and other information. The study involved large-scale diver and sampling efforts to develop design specifications for a 300-acre artificial reef for mitigation of lost kelp bed resources. Co-authored design process for pilot reef, which is under study by Coastal Commission staff.

**Various Applied Aquatic Science**

Designed a study for the determination of pile-driving effects on fish health using nested ANOVA.

Habitat Evaluation for the Port of Oakland Harbor Navigation Improvement (-50') Project  
Determined the distribution of kelp nitrogen content with respect to cooling water discharge from a coastal power station.

Used a stratified-random approach to estimate precision of cover estimates of various wetlands categories in New York State.

Analyzed the extent of impacts to fish associated with power plant operations; designed and led field studies in-plant and in the ocean to calibrate estimates of larval entrainment and adult equivalent losses based on estimates of nearshore abundance.

Directed the establishment of a relational data base of existing data on intertidal flora and fauna.

Surveyed larval tuna distribution in Hawaiian Archipelago and participated in research on primary and secondary productivity of Northwest Hawaiian Islands.

**Professional History**

Adjunct Instructor, Mendocino College 2017 to present

Independent consultant 2005 to present

Port of Oakland Environmental Planning, Marine Scientist, 1999 to 2005

ENTRIX, Inc., Senior Consultant, 1995 to 1999

MEC Analytical Systems, Consulting Scientist, 1992-1995

ENTRIX, Inc., Senior Project Scientist, 1988-1992

Los Angeles County Museum, Senior Environmental Scientist/Research Curator, 1983-1988

MBC Applied Environmental Sciences, Senior Scientist, 1982-1983

Marine Ecological Consultants of Southern California, Senior Research Biologist, 1980-1981

Hawaii Institute of Marine Biology, Postdoctoral Fellow, 1978-1980

Ichthyological Associates, Senior Research Biologist, 1976-1978

## Peer-reviewed Publications

- Gassel, Margy, Suhash Harwani, June-Soo Park, and Andrew Jahn. 2013. Detection of nonylphenol and persistent organic pollutants in fish from the North Pacific Central Gyre. *Marine Pollution Bulletin* 73 (2013), pp. 231-242
- Greenfield, B. K., A. R. Melwani, R. M. Allen, D. G. Slotton, S. M. Ayers, K. H. Harrold, K. Ridolfi, A. Jahn, J. L. Grenier, and M. B. Sandheinrich. 2013. Seasonal and annual trends in forage fish mercury concentrations, San Francisco Bay. *Science of the Total Environment* 444:591-601.
- Greenfield, B. K. and A. Jahn. 2010. Mercury in biosentinel forage fish in San Francisco Bay. *Environmental Pollution* 158:2716-2724.
- Jahn, A., and K. Herbinson. 2000. Design of a light-mediated behavioral barrier to fish impingement at a coastal power station in southern California. EPRI conference proceedings, Atlanta, 1999
- Grove, R., T. Dean, Deysher, and A. Jahn. 1998. An experimental reef program to test designs of an artificial reef for kelp mitigation. *Gulf of Mexico Science* 16:64-72.
- Jahn, A. E., W. N. North, J. Palmer, and R. Grove. 1998. Power plant discharge enhances nitrogen content of kelp (*Macrocystis pyrifera*). *Journal of Coastal Research*, 14:600-603.
- Deysher, LE., R. Ayers, R. Grove, and A. Jahn. 1995. GIS Analysis of Kelp Canopy Remote Sensing Data. Proc. Third Thematic Conference on Remote Sensing for Marine and Coastal Environments, Seattle, WA, 28 September 1995, pp. I-700 - I-708.
- Jahn, A. E., D. M. Gadomski, and M. L. Sowby. 1988. Diet of larval white croaker with respect to depth, larval size, and prey abundance. *Fishery Bulletin* 86:251-262.
- Barnett, A. M., and A. E. Jahn. 1987. Pattern and persistence of a nearshore planktonic ecosystem off southern California. *Continental Shelf Research* 7:1-26.
- Jahn, A. E. 1987. On the precision of estimates of abundance of coastal fish larvae. *American Fisheries Society Symposium* 2:30-38.
- Jahn, A. E., and P. E. Smith. 1987. Effects of sample size and contagion on estimating fish egg abundance. *CalCOFI Reports* 28:171-177.
- Lavenberg, R. J., A. E. Jahn, G. E. McGowen, and J. H. Petersen. 1987. Sampling for eggs of sardine and other fishes in the coastal zone using the CalVET net. *CalCOFI Reports* 28:178-182.
- Jahn, A. E., and R. L. Haedrich. 1987. Notes on the pelagic squaloid shark *Isistius brasiliensis*. *Biological Oceanography* 5:297-309.
- Jahn, A. E. and R. J. Lavenberg. 1986. Fine-scale distribution of nearshore, supra-benthic fish larvae. *Marine Ecology Progress Series* 31:223-231.
- Lavenberg, R. J., G. E. McGowen, A. E. Jahn, J. H. Petersen, and T. C. Sciarrotta. 1986. Abundance of southern California nearshore ichthyoplankton, 1978-1984. *CalCOFI Reports* 27:53-64.
- Petersen, J. H., A. E. Jahn, R. J. Lavenberg, G. E. McGowen, and R. S. Grove. 1986. Physical-chemical characteristics and zooplankton biomass on the continental shelf off southern California. *CalCOFI Reports* 27:36-52.

- Barnett, A. M., A. E. Jahn, P.D. Sertic, and S. D. Watts. 1984. Distribution of ichthyoplankton off San Onofre, California, with notes on sampling very shallow coastal waters. *Fishery Bulletin* 82:97-111.
- Garlo, E., C. Milstein, and A. Jahn. 1979. Impact of hypoxic conditions in the vicinity of Little Egg Inlet, New Jersey, in summer 1976. *Estuarine and Coastal Marine Science* 8:421-432.
- Jahn, A. E. 1976. On the midwater fish faunas of Gulf Stream rings with respect to habitat differences between Slope Water and Northern Sargasso Sea. Ph.D. Dissertation, Woods Hole Oceanographic Institution.
- Jahn, A. E., and R. H. Backus. 1976. On the mesopelagic fish faunas of Slope Water, Gulf Stream, and Northern Sargasso Sea. *Deep-Sea Research* 23:223-234.
- Wiebe, P. H., E. M. Hulbert, E. J. Carpenter, A. E. Jahn, G. P. Knapp III, S. H. Boyd, P. B. Ortner, and J. L. Cox. 1976. Gulf Stream cold core rings: large-scale interaction sites for open ocean plankton communities. *Deep-Sea Research* 23:695-710.

### **Selected Reports**

An Alternative Technique to Quantify the Incidental Take of Listed Anadromous Fishes at the Federal and State Water Export Facilities in the San Francisco Bay-Delta Estuary

Young Salmonid Out-Migration through San Francisco Bay with Special Focus on their Presence at the San Francisco Waterfront

RMP Foodweb Analysis; Data Report on Gut Contents of Four Fish Species

Power Analysis of the RMP Status and Trends Program: 1994 – 2003: A report to the Regional Monitoring Program of the San Francisco estuary Institute

The Cost to California Communities of Dealing with Trash, Working to Protect Waterways

On the Presence/Absence of Listed Salmonid ESUs in Central San Francisco Bay

Monitoring the Effects of Conventional Pile Driving on Three Species of Fish

Wetlands Status and Trend Analysis of New York State Mid-1980's to Mid-1990's.

Habitat Evaluation for Oakland's Harbor Navigation Improvement (-50') Project. Prepared for Port of Oakland.

The design of a local monitoring program for petroleum refinery effluent in the San Francisco Bay-delta system. Prepared for Western States Petroleum Association.

San Onofre Marine Mitigation Program: Develop Kelp Artificial Reef Site and Design Specifications. Final Report. Prepared for the Southern California Edison Company

### **Selected Oral Presentations at Scientific Conferences**

Precision of estimates of larval fish abundance. AFS, Larval Fish Conference, 1986.

Alongshore abundance patterns of ichthyoplankton. Southern California Academy of Sciences, 1988.

Panelist, Study Designs. 2nd Southern California 300-Acre Reef Conference, 1992.

Siting and Design of an Artificial Reef for Kelp. ECOSSET '95, Tokyo, 1995.

Enhancement of kelp nitrogen content by the discharge of a coastal power plant. Western Society of Naturalists, 1996.

Regional monitoring of fish eggs and larvae. Southern California Academy of Sciences, 1996.

A regional perspective on kelp loss at San Onofre - the need for multiple reference sites. Southern California Academy of Sciences, 1998.

Design of a light-mediated behavioral barrier to fish impingement at a coastal power station in southern California. 1999 EPRI Conference

Statistical basis for determining future RMP fish sampling frequency. San Francisco Estuary Institute Regional Monitoring Program Fish Workgroup, November 2005.

Summertime abundance patterns of silversides (Atherinopsidae) in east-central San Francisco Bay. 2007, American Fisheries Soc.